

WHAT IS CLAIMED IS:

1. The Plastic Injection Process with a double injection injector for the Manufacture of a Lid for an Electric Capacitor and the Product of such Process, featured because it consists of the two following stages:

- a) This involves the manner of manufacturing a Lid for an Electric Capacitor, that is injected in a double injection machine (4) in a single process, avoiding secondary activities; and involves design of the Lid of an Electric Capacitor that is formed by two Thermoplastic Resins, one rigid (17) and the other of rubber material (18);
- b) The Lid is injected in a double injection machine (4), which may have different closing tonnage capacities, depending on the size of the molds that must be injected;
- c) The sole and exclusive design of two steel molds that are mounted on the double injection injector, consisting of two halves each (24) + (12) and (36) + (13) in order to inject the two thermoplastic resins in a single step;
- d) The parts of the molds (24) and (36) are mounted on the fixed plate (5) and parts (12) and (13) are mounted on the rotating plate (6). Once the rigid part of the lid (17) is injected, the machine (4) opens and the rotating plate (6) turns 180 degrees, taking (12) or (13) to the fixed part of the mold (36) which has the form of the rubber material part of the lid (18) in order to be injected on (17), thus completing injection of the lid. The machine (4) opens and expels the finished lid, the rotating plate (6) turns 180 degrees to begin the process again;

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- e) Rotation of the halves of the molds (12) and (13) making them acquire different forms according to the side where they are located, is achieved through a system adapted to the molds that permits certain components of the molds to glide, either in a backward or forward position, thus forming the figure of the lid intended to be injected. This system may be activated through mechanic, hydraulic or pneumatic systems.

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2. Process according to claim 1, where the raw material (thermoplastic resins) is introduced in the drying bins of the injector machine (4), which are in the injection unit (1) and (2) respectively, The rigid thermoplastic resin is introduced in the bin of injection unit (1), and the rubber material thermoplastic resin is introduced in the bin of injection unit (2); we must mention that bin (1) or (2) may be indistinctly selected for either one of both thermoplastic resins used in the process; these resins must be dried for at least two hours before beginning the process and, and during it, at a temperature between 70 and 100 degrees centigrade.

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3. Process according to claims 1 and 2 where once the thermoplastic resins are completely dry, they are introduced in the canon of the injection unit (1) and (2), are heated by means of heating elements ranging between at temperatures between 150 and 350 degrees centigrade, the reason why the thermoplastic resins melt in order to be injected inside the molds mounted on the plates (5) and (6) of the machine (4).

4. Process according to claims 1, 2, and 3, where the thermoplastic resin melted inside the canon of the injection unit (1) and (2) is applied in order that they enter the molds and form part of the lid, depending on the position of the mold.

- (24) + (12) or (13) = injects the rigid part of the lid (17)
- (36) + (12) or (13) = injects the rubber material part of the lid (18).

5. Process according to claims 1, 2, 3 and 4, where once the thermoplastic resin has been injected in the molds, the plates (5) and (6) of the machine open, and the rotating plate (6) turns 180 degrees to invert the position of the halves of molds (12) and (13), and again inject the second thermoplastic resin of which the lid is made. We must mention that the manner in which the molds or the figures of the molds are inverted may vary, depending on the model of the injector machine (4) and the configuration of the machine, as there are double injection machines with a rotating plate (6) and injection machines with two fixed plates (5) instead of one rotating plate (6), and a fixed plate (5) as the one shown in this patent.

6. Process according to claims 1, 2, 3, 4 and 5 where thermoplastic resins are used, allowing waste resulting from the process described above to be reprocessed, making the manufacture of this lid cheaper than the current process, because current lids use thermo-fixed materials that cannot be reprocessed.

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7. Process according to claims 1 to 6, where the thermoplastic resins used have flame retarding V2 rating UL certificates; this is highly important because this is an electric product. Materials used to manufacture lids currently existing in the market lack this certification.

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8. Process according to claims 1 to 7, where a double injection machine is used to manufacture the lid, that can completely finish the lid in a single process, avoiding secondary assembly and machining work; additionally waste material may be reprocessed, which results in a cheaper lid, although thermoplastic resins are more expensive than materials used in already existing lids.

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9. Product obtained from the process described in claims 1 to 8, featured because it serves as upper lid of a case for an Electric Capacitor, and the design of the lid, that did not exist before this invention, as this is a different manner of manufacturing the lid, as the double injection machine injects the two parts of the Electric Capacitor Lid in a single process, avoiding secondary assembly and machining processes.

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10. Product obtained from the process according to claims 1 to 8, with respect to the specifications of the lid, a considerable improvement is achieved, compared to lids already existing in the market because of the type of

thermoplastic resins that permit us to have a flame-retardant UL rating of at least V2; material currently used in existing lids lacks this certification.

11. ~~Product obtained from the process referred to in claims 1 to 8, which~~ involves a better design of the lid, that includes an edge in the rigid part (7) which serves as mechanic grip in order that when the rubber material part (18) is injected, it will adhere perfectly to the rigid part (17). This in turn, allows a packing to be formed with the rubber material in the perimetric part of the piece (3), current lids do not have that perimetric packing (3) as they are not manufactured using a double injection machine that contemplates two molds that handle manufacturing in a single process, such as claimed in Clause 1, the reason why the lid with the protection proposed has better perimetric sealing, which is vital to secure there are no leaks of the dielectric contained inside capacitors, and thus extend the useful life of the capacitor.

12. ~~Product obtained according to claims 1 to 8, where the Capacitor Lid~~ with the protection proposed consists of two parts, a rigid part (17) in the upper part, and a rubber material part (18) in the lower part, it has two orifices crossing the two parts of the lid mentioned above (14) and (15) from side to side; it also has an valve (16) to exhaust gas that blows up when the capacitor overheats, and thus exhaust such gas when it is produced, the valve is formed with an orifice in the rigid part (17) which is covered in the lower part with the rubber material (19) forming the valve (16). It has an edge (7) in the rigid part (17) and another in the

flexible part (18), that serves as mechanical grip, so that the moment the rubber material part is injected (18), it may adhere perfectly to the rigid part (17); it also has a rubber material contour (3) that serves as perimetric seal with the case where it is assembled, avoiding leakage of the dielectric from inside the capacitor, giving the electric capacitor a longer life.

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13. Product obtained according to the process protected by claims 1 to 8, consisting in improvements in the performance of the lid, as thermoplastic resins used in this manufacture according to the process described in claim 1, are of a better quality than those used in lids currently existing worldwide, which permits the gas exhaust valve to blow open, thus securing greater safety for the final user, to avoid accidents and that it have a higher resistance against flame, as claimed in the clause.

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